

## **B. EMERGING RENEWABLE TECHNOLOGIES COMMERCIALIZATION PATHWAY**

*Submitted by the California Solar Energy Industries Association (CAL SEIA), Solar Energy Industries Association (SEIA), the California Energy Commission Energy Technology Development Division (CEC/ETD), and the Natural Resources Defense Council (NRDC)*

### ***1. Interpretation of Commission's Goals and Rationale for Strategy***

This proposal focuses on the key issues of resource diversity and the continuing development of additional renewable resources that the Commission's December 20, 1995 decision emphasized. In that decision, the CPUC reaffirmed that they are "**committed to establishing restructuring policies which maintain California's resource diversity for existing resources as well as encourage(ing) development of new renewable resources**". Regarding the importance of having a diverse number of renewable resources, the Commission further stated that "**it may be appropriate to establish floors for certain technology types, in order to maintain the diversity of our renewable resources**" and that "**encouraging resource diversity through the development of new resources is derived from Sections 701.1 and 701.3**".

Section 701.1 specifies that renewable energy resources include technologies utilizing wind, solar, biomass and geothermal energy. Maintaining and increasing California's resource diversity should, therefore, include a means for both preserving and encouraging the development of generation technologies and facilities in at least these four resource areas.

Unfortunately, none of the full implementation strategies being presented to the CPUC by the Renewables Working Group will adequately provide for this resource diversity. This is because all of the other proposed strategies are structured to exclusively favor existing renewable generating facilities and/or the technologies and resources they represent to the exclusion of newer renewable technologies and resources. None of the other proposals include a component or pathway through which newer technologies, such as photovoltaics, dish/stirling solar thermal electric or advanced biogas technologies, for example, could participate and fairly compete with existing technologies. These new or "emerging" technologies would augment California's resource diversity in critical and under-represented resource areas, such as solar. Solar technologies, for instance, are on a downward price trend, and this proposal would accelerate market transformation of this highly promising technology.

However, emerging technologies are economically precluded from any participation in the renewable strategies as proposed because their current generation costs are not, as of yet, able

to compete with existing facilities such as wind, biomass and geothermal. Our proposal seeks to focus attention on this critical gap by providing for the commercialization of emerging renewable technologies. Four approaches, utilizing either a purchase requirement or a surcharge mechanism, and/or linking to RD&D or energy efficiency programs as they are defined in the restructuring process, are proposed for bridging this gap.

## ***2. Program Overview and Description***

### **a. A Pathway for Emerging Technologies: The Missing Link**

The CPUC has clearly recognized the need for and desirability of providing support for California's renewable resources and for the RD&D process to develop new generation technologies. The development of any generation technology, however, is a continuum from research to development to demonstration to commercialization. The first three phases of this process can be maintained through the proposed use of a surcharge to continue funding these functions in a restructured electric services industry. The commercialization phase has not yet been clearly addressed by either the RD&D or Renewables Working Groups. Most of the implementation proposals from the Renewables Working Group focus on preserving the 5,000 MW of existing renewable generating capacity representing technologies that are largely commercialized, i.e. those whose current generation costs of 5 to 8 cents per kWh have been dramatically reduced from what their generation costs were when they emerged from RD&D years or decades ago. In many cases these cost reductions were achieved primarily through Standard Offer contracts, tax credits, or other publicly funded market creation activities.

New, emerging, solar and other electricity-generating technologies presently in the early or middle stages of the commercialization process have generation costs which are currently higher than this 5 to 8 cent range. While many of these emerging renewable technologies can be expected to reach generation costs comparable with the well-established renewables over time, the availability of small, but critical, markets for these technologies in their early stages are essential to the price reductions that come with completion of the commercialization process. The other implementation proposals, by focusing exclusively on minimizing projected program costs, and on preserving existing renewable generating capacity, would require these emerging technologies to compete with well-commercialized technologies, such as wind and geothermal. The Renewables Portfolio Standard proposal submitted by the wind, biomass and geothermal industries implicitly recognizes that solid fuel biomass, for example, cannot currently compete with wind or geothermal and must, therefore, have its own special type of credit and purchase requirement. If solid fuel biomass, with over 1,000 MW of installed capacity, is not yet fully commercialized, emerging technologies, with at most tens of MWs of previous installations, cannot be expected to compete directly with fully-commercialized technologies today.

The pathway outlined in this proposal introduces a commercialization component which is missing from the other proposals. This proposal outlines means of creating small, early markets, which would not add significantly to the overall cost of a renewables strategy. This proposal would create demand for approximately 200 MW of new generation facilities for selected emerging renewable technologies. These small new markets are less than 5% of the capacity of existing renewable generation and 0.2% of total generation and would be implemented over several years. The monies allocated to emerging technologies would ensure that cost reduction goals would be fostered through competitive market mechanisms, and would preserve California's role as the world leader in the development of renewable technologies such as solar energy.

There are several approaches that can be taken to bridge this commercialization gap. This proposal focuses on the two implementation strategies with the most supporters by providing suggested modifications to the purchase requirement-type mechanism proposed by the wind, biomass and geothermal industries, and the surcharge-type approach proposed by the Environmental Defense Fund and the investor-owned utilities.. The proposal also outlines a means of working within the Energy Efficiency and RD&D program structures. Any mechanism the Commission might choose to adopt, however, could be structured to provide an emerging technologies pathway. Regardless of which implementation strategy the CPUC ultimately selects, some provision for the needs of emerging technologies is crucial if valuable technological and resource additions to our renewables mix are to be advanced. We urge the CPUC to recognize that this is a critical component of the effort to ensure meaningful resource diversity and new resource development.

### **b. Modifying the Proposed Renewables Portfolio Standard Approach**

The Renewables Portfolio Standard (RPS) strategy put forward by AWEA and others is a good example of a market-based approach to preserving existing renewable generation facilities. Our modifications of this strategy to include a role for emerging technologies are as follows:

#### **NEW TECHNOLOGIES BAND**

One additional band, called the Emerging Technologies Band, would be created for all new renewable technologies that the state wishes to encourage. This band would be approximately 0.2% of generation in size, which equates to 500 GWh per year or 225 MW at a 25% capacity factor. Electricity generated by technologies in this band would receive Emerging Technology Credits (ETC). Like the proposed Biomass Energy Credits (BEC) of the RPS approach, the ETCs would be distinct from the general RECs and would constitute a separate purchase requirement. Unlike the BECs, they would not sunset after five years, since the need for a commercialization pathway for new technologies would continue for an indeterminate amount of time.

## **TECHNOLOGY SELECTION BASED ON DEFINED POLICY GOALS**

The state would establish certain specific and well-defined policy goals for the inclusion of technologies in this band. Such goals, for example, might include the development and preservation of renewable industries which create employment in California and in which California is the industry leader, which reduce greenhouse gases such as methane and carbon dioxide or other air pollutants, which require commercialization activities in order to reduce costs, or which provide the benefits of distributed generation. It is expected that technologies such as photovoltaics, dish/stirling solar, central receiver solar, and biogas from anaerobic digestion or pyrolysis of solid waste would be among those technologies initially included in this band.

## **CREDIT MULTIPLIERS**

To provide fair competition between technologies at different points in their commercialization process and, therefore, at substantially different generation costs, and/or to stimulate select technologies or applications such as distributed generation, the state could establish credit multipliers for technologies in this band. Thus, certain technologies could, for at least a limited time, receive more credits than others per MWh generated to compensate for their currently higher generation costs. These multipliers would be adjusted over time in response to actual or predicted reductions in generation costs. Credit multipliers do not increase the total cost of compliance, but rather affect the amount of electricity covered by the program.

## **ADMINISTRATION**

The CPUC, CEC or other state agency, in consultation with an advisory committee composed of industry representatives and other stakeholders involved with these new technologies, would periodically determine the technologies eligible for inclusion in this band and establish appropriate credit multipliers. The state could also ensure that selected technologies deliver on the anticipated price reductions that inclusion in this band should permit by adjusting the value of such credit multipliers over time. The overarching priority is for each technology to reduce generation costs to the point where they can compete in the other, larger bands of the portfolio, and ultimately in the open market.

## **RAMPING UP THE SUPPLY OF ENERGY TECHNOLOGY CREDITS**

Recognizing that this band would contain new technologies and that virtually all of the supply of ETCs will come from new plant construction, a provision for ramping up electricity production from plants in this band should be included. The proposers suggest

phasing in new production within this band at the rate of perhaps 0.05% of generation per year over a four year period.

## **CAPPING THE COST OF COMPLIANCE**

A shortage of credits to fill the purchase requirement could result in higher than projected credit prices. This is a risk for all bands in a market oriented approach, but especially for an Emerging Technology Band. One solution is to set a maximum price for traded ETCs and thereby provide a cap on the maximum cost of compliance. The credit price cap would be set at a level approximately 25 to 50% higher than the expected market value of these ETCs, for example 12 to 15 cents per kWh for ETCs with a projected value of 10 cents. In order to make such a cap work efficiently, and to provide a self-correcting mechanism to avoid continuing shortages of the credit supply which would cause credit prices to repeatedly reach such a cap, the state could become a "market maker". In the securities markets, a market maker is recognized as necessary to provide order and stability. For example, in the event of a shortage of ETCs, the state, as market maker, would sell ETCs at the cap price in order for purchasers to fulfill their purchase requirements. The funds collected by the state from such sales would be used, through a competitive process of production credits or grants, to stimulate and accelerate the construction of new generating facilities, thereby alleviating future credit shortages.

## **COST OF THE EMERGING TECHNOLOGIES BAND**

All market-based mechanisms share the common trait that the amount of the commodity is known, but the cost is not. The amount of electricity included in the Emerging Technology Band at 0.2% of total California generation is approximately 500,000 MWh per year. Our best estimate is that an ETC would initially trade at approximately 10 cents per kWh given the early commercial stage of emerging technologies. This would give a projected annual cost of \$50 million for compliance. The cost could vary depending on the rapidity of generation cost reductions under this approach.

### **c. Modifying the Surcharge Approach**

The Surcharge Distributed as a Production Credit approach proposed by the Environmental Defense Fund and others would require very little modification to accommodate emerging technologies.

## **DELINEATE A PORTION OF THE SURCHARGE FOR EMERGING TECHNOLOGIES**

The Surcharge proposal does not specify the amount of funds that would be generated by such a surcharge, however 1% of 1994 revenues from IOU electric sales would produce

approximately \$209 million per year. To create markets of approximately 200 MW in size for emerging renewable technologies, as estimated above for the RPS approach, would require an ongoing allocation of approximately \$50 million per year. Emerging technology manufacturers have indicated that such an investment would significantly impact the downward price trend of these technologies.

The Surcharge proponents propose to provide production credits to selected projects for a term of 10 years. However, given that under their proposal a surcharge might only be in place between 1998-2000, funds could not be awarded in the year they are collected, but rather most of the funds would be "banked" to ensure that the full 10 year credit obligation could be met if the program were to be terminated in less than 10 years. These banked funds could conceivably earn interest while being held, thus further complicating the calculation regarding the amount of 10 year production contracts able to be awarded in any given year.

To fund 200 MW of emerging renewables would require that portion of the surcharge funds generated which, with interest on monies held in reserve, would total approximately \$50 million worth of projects per year for ten years. As with the proposed RPS modifications presented above, the 200 MW of generation capacity could be phased in over 4 to 5 years, yielding the benefit of increased interest on retained funds in early years, thereby reducing the overall cost of the commitment. Once the financial variables were fixed, and the exact proportion of the surcharge necessary to fund 200 MW of emerging technology projects is established, the Surcharge approach could be easily modified to set aside some portion of the surcharge for emerging renewable technologies auctions, separate from the auctions for all well-established renewables.

## **ADMINISTRATION**

The state agency administering the program would select the emerging technologies eligible to compete. The administrator might also need to make further groupings among these technologies so that those emerging technologies at different points in the commercialization process would not be asked to unfairly bid against each other if they have significantly different generation costs. This could be readily accomplished by separate credit auctions for technologies at approximately similar generation costs.

### **d. Add a Commercialization Component to RD&D Programs**

Commercialization activities are a logical extension of research, development, and demonstration programs. When a technology emerges from the demonstration phase of RD&D, markets must be found which will further incentivize production and material cost reductions, design improvements, and will engender economies of scale. While commercialization has, at best, been a marginal component of prior state or ratepayer funded

RD&D programs, an opportunity now exists to structure an RDD&C continuum which bridges the gap between traditional RD&D and fully commercialized technologies.

### **INCLUDE ADDITIONAL FUNDS IN RD&D BUDGETS WHICH WILL TARGET COMMERCIALIZATION OF EMERGING TECHNOLOGIES**

As in the methods outlined above, adding funds to RD&D for the specific purpose of commercializing new technologies such that approximately 200 MW of new capacity could be built would require an ongoing allocation of approximately \$50 million per year for ten years. The mechanism for allocating these funds could be identical to the surcharge approach to funding commercialization activities outlined above, utilizing competitive market mechanisms to ensure that competition would force price reductions over time, eventually leading to competition in open bulk power markets.

### **ADMINISTRATION**

Again, as in the surcharge approach, the state or other agency administering the program would identify the emerging technologies eligible to compete. Similarly, the agency could group technologies in similar cost ranges together to compete for available funds in order to encourage cost effectiveness within technology sectors.

#### **e. Utilize New Energy Efficiency Funds to Buy Down the Cost of Distributed Renewables**

From both the utility's and the end user's perspectives, energy savings from distributed renewables situated on the customer side of the meter are indistinguishable from traditional energy efficiency measures, such as energy efficient lighting, for example. Aggressive commercialization of promising emerging technologies is the only means of surmounting the last remaining hurdle preventing the increased use of renewables: higher first cost. Perhaps the best example of distributed renewables is photovoltaic (PV) technology. The PV industry has long viewed the locational siting capabilities of PV equipment as one of its most salable attributes. Utility Distribution Companies (UDCs) can incentivize the location-specific siting of PVs by passing through transmission and distribution benefits to PV developers and end-users. Energy efficiency incentives can also accelerate the commercialization of PV technology. However, regulatory issues surrounding utility distribution company (UDC) ownership of distributed generation of any type may make ownership by the UDC problematic. This issue does not exist when an end user, PV developer, energy service company, community aggregator or direct access provider is incentivized to make the purchase.

### **INCLUDE ADDITIONAL FUNDS IN ENERGY EFFICIENCY BUDGETS TO INCENTIVIZE END USER PURCHASE OF DISTRIBUTED RENEWABLES**

As earlier stated, in an effort to identify as many means as possible of providing for the commercialization of emerging technologies, and in consideration of the fact that distributed renewables closely resemble energy efficiency and/or DSM measures, a logical means of encouraging end user purchase of those renewables that lend themselves to distributed generation applications, such as PVs, is to utilize new energy efficiency funds to incentivize private purchases. One way to accomplish this would be to buy down the price of distributed renewable generation to a point where the end user pays the same, or nearly the same price for both the required incremental power purchases and the renewable hardware costs together, as they would otherwise have paid for the electricity alone. This methodology could be implemented in addition to one of those previously identified, in that it would approach the end user market rather than the bulk power market, yet would yield benefits identical to the other commercialization avenues. This example is applicable to either residential or commercial applications of distributed renewables.

It should be stressed that the proposers do not advocate the expenditure of energy efficiency funds for this purpose at the expense of traditional energy efficiency programs, but rather recommend that, should this approach be chosen, monies from those appropriated for renewables as a whole be allocated for this purpose.

#### **ADMINISTRATION**

This approach could be administered through the same agency which is empowered to administer energy efficiency programs after restructuring. Again, market forces could be used to foster price competition in much the same way as the methods outlined earlier.

#### **REQUIRE UDCs TO PASS THROUGH LOCAL T&D BENEFITS TO ACCELERATE THE COMMERCIALIZATION OF DISTRIBUTED RENEWABLES ON THE DEMAND SIDE**

As stated above, UDCs can play a decisive role in encouraging the implementation of location-specific distributed renewables in a way that does not conflict with vertical unbundling or any other facet of restructuring. This can be accomplished by UDCs passing through the localized benefits of PV in T&D systems to end users, third party PV developers, and retail providers, to the extent that these benefits exceed those of single net metering for residential customers. For example, the benefits of deferring a substation upgrade or feeder line upgrade, or of enhancing voltage support or reliability, can be quantified and offered as an incentive for end users or third parties to install PV. Location-specific real-time T&D pricing is another way to accomplish this.

#### **ADMINISTRATION**

By UDCs, with the oversight of the CPUC. By municipal utilities and others as ordered by law.

### ***3. Implementation Questions***

#### **a. What is the Obligation?**

*a.1. How is "renewables generation" defined for purposes of qualifying for tradable "Renewable Energy Credits" under this proposed program? Do existing and incremental utility-owned renewable-resource generation qualify for Renewable Energy Credits?*

All renewable technologies not currently cost competitive with non-renewables, but which hold potential for significant cost reductions given adequate markets would qualify. Utility owned generation would also qualify for Renewable Energy Credits (RECs).

*a.2. What are renewable energy credits? How do they relate to energy portfolio management?*

For an RPS-type mechanism, credits accrue when renewable electricity is generated. Using a modified RPS strategy, there would be three types of energy credits: RECs, Biomass Energy Credits (BECs) and Emerging Technology Credits (ETCs) for appropriate generators in the technologies assigned to each band of the portfolio. Each entity required to obtain credits must obtain them from technologies in each established band in accordance with renewable generation purchase requirements.

*a.3. How are a diversity of renewables encouraged?*

In the case of our proposed modifications to the RPS market-based approach, the proposers would add an emerging technologies band, similar to the biomass band of the RPS proposal. This band would provide a market in which emerging renewable technologies, which currently have higher costs than well established renewable technologies, could effectively compete. Photovoltaics and new solar thermal technologies cannot currently compete with wind or geothermal for the same class of RECs. The projected 1.5 to 2 cents per kWh that the RECs are expected to sell for will do very little to help provide markets for these new renewables, and there are no other state or federal programs on the horizon which could provide meaningful amounts of additional support to such emerging technologies. If the strategies proposed in this report are not adopted in order to provide for the needs of emerging technologies, it is difficult to envision other avenues for their continuing commercialization.

In the case of surcharge-type implementation approaches, the proposed modification creates a set-aside within the surcharge for emerging technologies to compete for production credits in order that all production credits are not awarded solely to a limited number of established technologies primarily in the wind, geothermal and solid-fuel biomass areas. The RD&D and Energy Efficiency program modifications could function in the same way as the surcharge credit award mechanism by basing credit awards on a variety of the desirable attributes of emerging renewable technologies.

This proposal suggests a number of paths which would provide real opportunities for new and less commercialized technologies to be able to effectively compete and obtain financial support, and would add meaningful amounts of a variety of solar resource technologies, as well as additional technologies in other resource areas, such as gas-fueled biomass.

*a.4. Are currently-high-cost technologies or pre-commercial technologies fostered by this program?*

Yes, see question a.3. above.

*a.5. How is renewable self-generation handled? Is self-generated renewable energy eligible for Renewable Energy Credits, or for other means of support?*

Surplus generation that is metered and sold at retail from grid-connected renewable facilities owned by customers or other third parties could be eligible for RECs. However, as with off-grid applications, self-generated power produced for on-site consumption would be administratively difficult to verify for the purpose of qualifying for RECs, which are currently designed to target centrally-generated renewable electricity that is sold into the grid at retail. However, self-generated on-grid applications could be supported through the public goods charge for energy efficiency programs because they help reduce customer demand on the California electric generating system. These specific applications could qualify for energy efficiency funds that are distinct from and in addition to those funds allocated to traditional energy efficiency and DSM programs to incentivize demand-side (self-generation) applications by the watt, or size of the system. These funds could be used to help buy down the up-front cost of purchasing a customer-owned generation system, as opposed to using RECs to incentivize customer-owned systems on a per kWh basis.

Third-party-owned, on grid generation connected on the customer side of the meter could qualify for RECs, provided the power is sold at retail. Power consumed on-site would, as above, be supported through energy efficiency programs.

*a.6. How are hybrid fossil-fuel/renewable facilities handled?*

Renewable generators using up to 25% fossil fuel would fully qualify as renewable. For generators using more than 25% fossil fuel, only the renewable-fueled fraction would qualify.

*a.7. Does out-of-state generation qualify for Renewable Energy Credits? Is it desirable or necessary to protect in-state California renewable energy generators from out-of-state competition? Is it possible?*

While restricting the program to in-state generation might be preferable, out-of-state generation could qualify assuming adequate restrictions could be placed on out-of-state hydro to avoid the problem of hydro capturing the RECs to the exclusion of other renewable technologies. California wind, geothermal and solar resources are large and should be able to compete with out-of-state plants of the same resource. Hydro would appear to be the only technology of concern.

*a.8. If hydro is included, how are practical issues associated with hydropower handled?*

Inclusion of hydro is possible but not necessary. Low cost hydro which can compete on a cost basis with non-renewables should not be included. Small hydro or more expensive, recently-licensed or environmentally-mitigated hydro, whose current costs are much higher than non-renewables, could be included if the amount of electricity and annual variations in output would not unduly disturb the workings of the implementation strategy.

*a.9. How is utility-owned generation of distributed renewables handled? Is it eligible to receive RECs or surcharge funds? Does the proposal permit RECs or surcharge funds to accrue to distributed or other renewable applications that may involve the cross-subsidization of generation with T&D savings, or vice versa? Does the proposal permit or prohibit distributed or other utility-owned renewable power not sold through the power exchange to receive credits or surcharge funds?*

Utilities are widely viewed as being a critical player in the effort to commercialize photovoltaic technology, and any restriction which prevents their involvement in this effort would be alarming. Nevertheless, distributed PV applications are in fact distributed generation, and in that sense should be subject to the same restrictions which may be placed on a utility's ability to own generation of any type. While the Commission may decide that the benefits of commercializing emerging technologies, such as PV, outweigh cross-subsidization or market power concerns, the Commission needs to address the market power, self-dealing, cross-subsidization, and functional unbundling issues associated with UDC ownership of distributed generation before such ownership is allowed. UDC ownership could also be inconsistent with the Commission's requirement that all utility and affiliate power be bought and sold through the power exchange. Until these issues are resolved,

UDC- and utility Genco- and affiliate-owned distributed renewables should not qualify for RECs or public purpose surcharge monies.

*a.10. What is the level for the requirement? How does this level relate to the level of renewables from 1990 to the present? Does the level of the requirement increase over time, and, if so, at what rate?*

If modifying the Renewable Portfolio Standard proposal, the additional requirement of an emerging technology band could either increase the RPS requirement by 0.2% to 10.2% of generation or the 0.2% for emerging technologies could be incorporated within the 10% requirement, as with the proposed biomass band. In either case, the full 0.2% for emerging technologies would be phased in over the first four years of the program at the rate of 0.05% of generation per year. If modifying the EDF surcharge proposal, the overall level does not change, however a portion of the requirement would be set aside for emerging technologies. The RD&D and Energy Efficiency program models would result in the addition of the same amount of new resources as both the RPS and surcharge proposals.

*a.11. Describe how, if at all, the compliance obligation adjusts during a transition period.*

See answer to question a.10. above.

*a.12 Does the proposal include a uniform requirement for all electric providers on a statewide basis?*

Yes

*a.13. What is the time-horizon for the program?*

In order for new generation facilities to obtain the longest financing term and, therefore, the lowest annual costs, which in turn will result in the lowest renewable electricity costs to consumers, the chosen implementation strategy should have no specific time horizon or a minimum duration of at least 15 to 20 years. Portions of the program could sunset earlier if no longer needed.

*a.14. Is the requirement established on a percentage of Megawatts or percentage of Megawatt-hours basis?*

Either is possible, but using a MWh basis would avoid the problem of over-compensating under-producing facilities.

*a.15. Does the proposal establish floors for certain technology types? What is the rationale for a technology floor, if proposed?*

The proposal does not establish floors for certain technologies, but rather would establish a band or set aside for a range of emerging technologies to compete within. In the case of market-based strategies, no technology would have a guaranteed level of purchase or support, as with floors, but rather technologies in the emerging technology band would compete with each other. All selected emerging technologies could expect to remain in the emerging technology band for a limited time period. As their generation costs decline due to successful commercialization, technologies would move to other bands of an RPS-type mechanism with the ultimate goal to be complete removal from the program when their generation costs become competitive with non-renewable generation.

**b. Where is the Obligation to Comply?**

*b.1. On whom is the requirement applied? Is the requirement applied only to entities under the Commission's jurisdiction, or is it applied statewide?*

Optional, initially it could be applied either to only to those utilities under CPUC jurisdiction, however the proposers believe that ultimately any chosen renewables requirement should be applied to all California utilities.

*b.2. Are regulated retail providers treated similarly to unregulated retail providers? If not, what are the differences?*

No difference.

*b.3. What is the penalty for non-compliance? Should this penalty be interpreted as a cost-cap for the program?*

No position on this question.

*b.4. How is non-compliance determined? Who is responsible for determining non-compliance and for resolving disputes arising from such a determination?*

No position on this question.

*b.5. What provisions add flexibility to compliance, if any?*

If there is a surplus of credits, credits could be saved or "banked" to be applied in the future years. If a shortage of credits caused credit prices in the spot market to reach the ceiling price, the program operator would become a "market maker" and sell credits at the ceiling price to satisfy the need.

*b.6. How does the program ensure that the policy and its costs are non-bypassable, such as the CTC or the Public Goods surcharge?*

By imposing the requirement to satisfy whatever renewables policy is implemented on all retail suppliers, for example, the costs would be non-bypassable to the maximum extent practicable.

### **c. How are Renewable Energy Credits Initially Allocated?**

*c.1. How are Renewable Energy Credits generated from existing renewable facilities (QFs and utility-owned) initially allocated? What impact does the initial allocation have on whether a vigorous market for Renewable Energy Credits, characterized by many buyers and sellers, forms?*

No position on this question.

*c.2. What is the relationship of the allocation of Renewable Energy Credits and the CTC or Public Goods Surcharge? Will Renewable Energy Credits accrue to technologies, such as on- and off-grid renewables, in a way that would encourage customers to disconnect from the grid or otherwise avoid part or all of the CTC and Public Goods Surcharge?*

Renewable Energy Credits would not accrue to off-grid renewables. However, grid-connected renewables would accrue credits on all generation output delivered to the grid. This should not encourage customers to disconnect from the grid, but just the opposite, if the credits have adequate value to a generator.

See also a.5. regarding renewable self-generation.

*c.3. If customers or ratepayers are initially allocated Renewable Energy Credits, how are the credits administered?*

No position on this question.

*c.4. How would the proposed Renewable Energy Credit allocation affect negotiations to buy out existing QF contracts? Would it encourage or discourage such buyouts? Would it make them more or less cost-effective to ratepayers?*

The modifications to implementation strategies proposed here deal primarily with new generation not currently under existing QF contracts and should, therefore, have little effect on the issue of buyouts.

*c.5. How does the initial allocation deal with the possibility of windfall profits accruing to individual renewables generators, or types of generators?*

No position on this question.

*c.6. Does the proposal potentially increase the value of utility-owned renewable resources in a way that would encourage their divestiture? If so, how should ratepayer interests be addressed?*

No position on this question.

#### **d. How is the Program Administered?**

*d.1. What agency certifies Renewable Energy Credits?*

No position on this issue.

*d.2. What mechanisms are proposed for trading of Renewable Energy Credits? How do the trading mechanisms relate to the initial allocation of Renewable Energy Credits?*

Renewable Energy Credits (RECs) or BECs or ETCs could be obtained by three methods: the party obligated to obtain credits (the "Obligatee") could generate renewable power from facilities it owns, the obligatee could enter into bilateral contracts with producers of credits for their purchase, or the obligatee could purchase credits on a multi-party, competitive "spot" market. Parties with excess credits of any band could sell or trade such credits through this spot market or directly with other parties through bilateral agreements.

*d.3. What mechanisms are proposed for program oversight and mid-course corrections?*

In the case of the RPS approach, the program administrator would periodically (1-3 years) review the current generation costs for technologies and adjust the value of any credit multipliers and possibly reconsider the continued inclusion of a particular technology in the emerging technology band. The administrator could also review and adjust any credit ceiling prices of the credits. For a surcharge approach, the administering agency could similarly periodically review what technologies should be included in any set aside for emerging

technologies. Similarly, the administrator of the RD&D and/or Energy Efficiency Programs would conduct appropriate technology reviews.

*d.4. What agency monitors and enforces compliance with the program, and how is it carried out?*

No position on this issue.

#### **e. Cost-Related Issues**

*e.1. What are the costs associated with the program, and who pays?*

Assuming that the allocation of 0.2% of generation is added to the existing 10% specified in the RPS proposal, the program is estimated to cost only 10-15% more than the RPS proposal with the same parties bearing the costs as with the RPS proposal. With a surcharge approach, there need be no additional cost associated with the proposed modifications since the proposal only reallocates how surcharge monies are spent. If RD&D and Energy Efficiency Programs are funded through the surcharge approach, and the chosen method of implementing commercialization of emerging technologies is by adding a commercialization component to either of these programs, then the cost associated with the programs would be allocated from renewable surcharge funds to either RD&D or Energy Efficiency Programs for commercialization activities.

*e.2. What cost-containment measures, if any, are provided?*

For the RPS approach, a ceiling price on the cost of emerging technology credits in the spot market limits the maximum cost to comply. Additionally, competition between generation facilities and technologies within the emerging technology band, as well as the three different methods of acquiring credits outlined in question d.2. above, should maintain downward pressure on credit prices.

If commercialization is funded through a surcharge approach, cost-containment can be achieved by fixing the maximum surcharge monies available for the program.

*e.3. If the program utilizes floors for certain technology types, what are the cost implications?*

While the program does not utilize strict floors for certain technologies, it does create a band for emerging renewable technologies. While the credits for such emerging technologies (ETCs) are expected to cost more than the basic RECs or BECs of the RPS proposal, the much smaller size of this emerging technology band (0.2% of generation) results in little overall additional cost to the obligatees compared to the unmodified RPS proposal. The

corresponding benefits of this emerging technology band, however, are great considering that promising technologies with the potential to reach low generation costs are afforded a pathway to enable them to achieve lower costs rapidly and efficiently, and, consequently, at a lower total cost that would otherwise have been the case.

*e.4. Will implementation of the program lead to cost-shifting between consumer groups or regions of the state?*

If the obligation is placed only on utilities under PUC jurisdiction, then cost shifting will occur since only the ratepayers of these utilities would be funding all renewables programs (assuming no other utilities implemented similar programs). If a uniform obligation on all utilities is imposed, cost-shifting issues will be avoided.

*e.5. How is competition within and between renewable technologies encouraged? Between existing renewables facilities and potential new facilities?*

The proposal provides for meaningful competition between technologies by permitting emerging technologies, and developers within such technologies, to compete within an emerging technologies band or set aside. Absent this, there is no meaningful competition if new, emerging technologies at higher early generation costs are forced to compete with mature, well-established technologies. Further, this proposal makes it possible for existing and newly constructed facilities employing emerging renewable technologies to compete with each other, while likewise permitting competition between existing and new facilities using well-established technologies.

*e.6. What implications, if any, does the proposal have in defining the roles of the LDC and of competitive suppliers of electricity?*

Unknown.

*e.7. What is the consistency of this proposal in relation to cost-related guidance provided by the PUC Roadmap?*

Unknown.

**f. How does the Program Fit with Other Aspects of Electric Industry Reform?**

f.1. Is the program compatible with the existence of an Independent System Operator? A Power Exchange? A Direct Access Market? Is the proposal consistent with the Commission's vision of the role of the Power Exchange and ISO?

No position on this question.

f.2. *Is the proposal dependent in any way on the Power Exchange or ISO? If so, are any additional protocols necessary?*

No position on this question.

f.3. *Does the proposal involve conflicts of interest between distribution and competitive retail service? If so, how are they resolved?*

No position on this question.

f.4. *How does the program avoid conflicts of jurisdiction between state and federal levels?*

No position on this question.

f.5. *What is the relationship between the proposal and Direct Access "Green Marketing"?*

Direct Access "Green Marketing" might benefit some renewable technologies, but not others, as the renewable technologies and the relative proportions of each to be "Green Marketed" is unknown and uncontrollable. The proposed program would benefit all technologies, with appropriate levels of benefit in relationship to the different technologies' levels of commercialization.

f.6. *What is the relationship between the proposal and Performance Based Ratemaking (PBR)? Does the proposal place Renewable Energy Credits under PBR, or exclude Renewable Energy Credits from PBR?*

No position on this question.

f.7. *Does the program create any potential market power problems involving the generation market or Renewable Energy Credits?*

No position on this question.

*f.8. How does the proposal relate to any consumer protection or consumer education efforts? For example,*

*a. Rules for new entrants: Does the proposal entail any licensing requirements for new entrants? Should compliance with the minimum renewables requirement be a condition of selling power at the retail level?*

*b. Consumer education: Does the proposal require any consumer education? For example, how does the proposal protect consumers from "green marketing" programs where marketers collect twice -- once for credit sales and once for "green" power sales, thereby not increasing total green power? This could entail, e.g., disclosure requirements to inform consumers about the amount of renewable energy they are purchasing that are supported by Renewable Energy Credits, or statements regarding price stability or price risks associated with the seller's resource portfolio. Would RECs accrue to utilities from green pricing programs where utilities have unique customer information and access?*

No position on this question.

*f.9. How, if at all, does the proposal relate to RD&D programs funded by the Public Goods Charge?*

Should the Commission decide that the appropriate vehicle for commercializing emerging technologies is to add a commercialization component to RD&D programs, then the proposal outlines a means for accomplishing this. It describes a way for technologies emerging from RD&D to construct commercial-scale plants and to receive the necessary prices for the electricity from these early, more expensive plants to permit the industry to make the investment necessary to reduce generation costs to lower levels consistent with a mature technology.

*f.10. How, if at all, does the proposal relate to energy efficiency programs funded by the Public Good Charge?*

Should the Commission decide that one appropriate vehicle for commercializing emerging technologies is to utilize new energy efficiency funds to buy down the costs of customer-owned distributed renewables, then the proposal outlines a means for accomplishing this. It conceptualizes a method for bringing the price of electricity generated from distributed renewables situated on the customer side of the meter to market levels by using the funds to reduce first costs of systems, allowing the owner to operate the system at a cost near or at that which they would have paid to purchase electricity had no system been installed. This proposal is premised on the assumption that energy efficiency programs would be restored to their historic funding levels, and that funds for distributed renewables would be separate and distinct from, and in addition to, funds for these "traditional" energy efficiency programs.

*f.11. How does this proposal affect the CEQA compliance work recently initiated*

*by the Commission?*

No position on this question.

**g. Legislative Requirements**

*g.1. Can the Commission implement this proposal by itself, or is legislation needed? What is the status of entities not under the Commission's jurisdiction in this program?*

Can be implemented for regulated utilities alone by CPUC, although the inclusion of all utilities by Legislative action would be preferable.

*g.2. What steps are needed to implement the program, and how long would it take? How does this implementation timing relate to the CPUC's 1998 implementation goal?*

No position on this question.

#### ***4. Positions of the Parties in Favor/Neutral/Oppose***

##### **Comments of the CPUC's Division of Ratepayer Advocates, the Utility Consumers Action Network, and the Independent Power Providers**

DRA/UCAN/IPP conditionally support this proposal because:

1. UDCs and affiliates do not receive credits or surcharge moneys to own distributed renewables on customer or other sites. [CalSEIA has flagged the question of UDC ownership for resolution by the Commission.]
2. UDCs pass through local T&D benefits to accelerate commercialization of distributed renewables owned by customers and competing providers.

DRA/UCAN/IPP's condition for supporting this proposal is:

3. It does not raise rates.
4. Distributed renewables at customer locations are supported as energy efficiency measures connected on the demand side of the meter, rather than through the renewables program.
5. Central station emerging renewables are funded through a surcharge, rather than a band.

##### **Comments of AWEA/CBEA/GEA/STEAD**

SUPPORT WITH MODIFICATION: As stated in our proposal, we support policies and funding to support the commercialization of emerging renewable technologies. Commercialization would be best achieved through a surcharge, but we do not support the "auctioned credit" approach for the practical reasons stated in appendix. Commercialization programs should be handled by the RD&D administrator, allowing flexibility and judgment in allocation of funds. Accomplishing commercialization by adding a tiny technology band to the market-wide RPS program and adding administrative involvement is inconsistent with the RPS approach which is geared toward bulk-power resources and intended to minimize administrative involvement.

### **Comments of the Surcharge/Production Credit Proposers**

1. Recognizes emerging technologies: Offers emerging, environmentally sensitive technologies a vehicle to achieve commercial viability that may otherwise be unattainable.
2. Realistically aims for small market first: Seeks small market share for technologies currently unable to mass produce. Acknowledges emerging technologies will subsequently create their own market share under open competition.
3. Complicates program administration: If appended to the portfolio standard proposals, an additional type of credit/tier must be administered. If appended to the surcharge proposal, funds must be set aside and separately administered.

### **Comments of Orange County, Sonoma County, the City of Sacramento, NEO Corporation**

We oppose this proposal because it discriminates among technologies with tiers and is not market driven. All renewables should be competitive in their own market. Funds should be distributed through a simple price only auction. Regulated or engineered tiers are an invitation to manipulate engineering, construction and operating and maintenance costs. It is a BRPU approach we strongly oppose. Perhaps his proposal would be a way to handle RD&D funding.

### **Comments of the Union of Concerned Scientists**

#### **Support**

*Pros*: Addresses commercialization of new technologies, which otherwise may languish between RD&D and support offered by RPS. UCS supports two approaches in proposal: adding commercialization component to RD&D programs and adding energy efficiency funds to buy down cost of distributed renewables. Supplementing RPS with PGC funding for commercialization, minimizes complexity, while maintaining market-based approach of the RPS. RD&D administrator can apply flexibility and judgment in allocation of funds. Additional energy efficiency funds to incentivize end user purchase overcomes high capital cost barrier.

*Cons*: Assignment of credit multipliers for Emerging Technology Credits band administratively complex, open to influence by stakeholders.

### **Comments Los Angeles Department of Water and Power (LADWP)**

Procurement of renewable resources should be the responsibility of some state entity for the state power pool and the above-market cost of compliance should be borne uniformly by all customers served by the UDC on a non-bypassable basis. Rather than having many entities responsible for procurement of renewables, having one entity responsible for the state's procurement of renewables will minimize the compliance transaction costs. The level and diversity of renewable resource mix should be established by the legislature which would determine the appropriateness of establishing set asides for certain renewable resources. The renewables program should be reviewed every five years.

### **Comments of Southern California Edison**

The CALSEIA proposal makes the argument that emerging technologies need more financial assistance to be competitive than other, more established, renewables. Therefore they propose modifications to both the surcharge and MRPR proposals that would provide more assistance to emerging technologies to help them develop.

This raises the policy question of whether the Commission intended to simply generate kwh from renewables or whether they intended to nurture emerging technologies. If the Commission decides that technology development is a priority, and should be accomplished via renewables preference program, then the simplest way to do that is through the surcharge approach (EDF/SDG&E). A percentage of the surcharge funds can be reserved for distribution to promising emerging technologies.

### **Comments of the California Integrated Waste Management Board**

*Support with conditions:* The CEC's proposal expands the Renewable Portfolio Standard to include a band for a limited number of projects which use "emerging" technologies. The eligible technologies would be determined at a later date.

The proposed emerging technology band could provide nearly as much renewable energy development as the production credit model while providing funding for higher cost technologies.

The emerging technology band borders on a Research Development and Demonstration proposal, but could be added to other RPS proposals with some minor modifications.

### **Comments of Don Augenstein**

I strongly endorse the "Emerging Renewables Technology Commercialization Pathway" proposal of CALSEIA, et al. The problem of advancement of technologies in early stages of commercialization is serious and this proposal addresses that particular problem. Its mechanism of allowing added RECs for projects with environmental benefits is also endorsed.

### **Comments of SoCAL Gas**

OPPOSE - Proposal calls for an emerging technology subsidy. Its goal is to enable currently under-represented renewable technologies to become active participants in the mix of available renewable technologies. The concept is based on the idea that a minimum level of production is needed for production efficiencies and cost reductions. It calls for the CEC to bridge the gap between RD&D and commercialization. However, this proposal is nothing more than an industrial policy, relying on an infant industry argument, where the CEC believes it can pick winners and losers better than the marketplace. There is no economic justification for such a policy.

### **Comments of CAL SEIA et al. on their Own Proposal**

The proposers believe that by formulating a means for commercializing solar and other emerging technologies within the electric industry restructuring proceedings, the Commission and/or the legislature will be establishing a pathway for the commercialization function which existed in years past, but does not exist today, and without which many of today's commercialized renewable technologies would not enjoy their current low generation costs.

### **Comments of SDG&E**

Oppose:

- \* No cost limitation.
- \* Under MRPR this proposal would inequitably burden consumers. San Diego area consumers would see rate increases.
- \* Requires significant funding expenditures without any guarantee that projects would benefit California consumers.
- \* Distinction between emerging technologies and RD&D related projects/project funding unclear.

- \* Funding possibly available from other sources (e.g RD&D, tax incentives, etc.).
- \* Could be inconsistent with State policy. State/CPUC must decide what types of emerging technologies to promote.

### **Comments of IEP**

- Does not address existing renewables
- In the absence of full direct access, does not provide adequate price signals to sustain competition for the production credits. For example, in the absence of any direct access, the sole purchaser is the utility under a SOI contract, and the price paid to all renewable producers will be the marginal clearing price of the PX. The only variable affecting allocation bids will be the producer's operating costs, which remain relatively fixed over time. The absence of buyer/seller price variability will likely result in a single entity garnering all the production credits.

### **Comments of PG&E**

PG&E believes that the heart of both the RPS and surcharge proposal is to have renewable-on-renewable competition and maximize the generation of renewable energy. Should society wish to explicitly support the development of higher-cost renewables as a way to encourage their eventual commercialization, this could be done as either a second auction within the surcharge or an explicit development fund within public good R&D. Care should be taken to keep it simple.